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THE USE OF A ROTATING ANODE IN THE ELECTROLYTIC PRECIPITATION OF URANIUM AND MOLYBDENUM.

By EDGAR T. WHERRY AND EDGAR F. SMITH.

[CONTRIBUTION FROM THE JOHN HARRISON LABORATORY OF CHEMISTRY.]

(Read November 3, 1906.)

I. URANIUM.

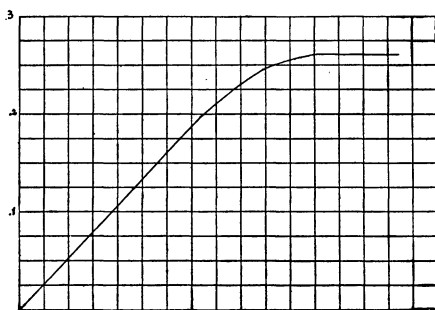
The early suggestion of Smith (*Am. Ch. Jr.*, 1, 329) that uranium could be completely precipitated by the current from an acetate electrolyte has been amply verified, and the purpose of these lines is only to record the conditions under which the deposition takes place when using a rotating anode. The salt applied in the experiments was uranyl sulphate. The form of apparatus and mode of rotation have been fully discussed in the numerous communications from this laboratory relating to the rapid precipitation of metals. It will not be necessary either, to comment further upon the form in which the uranium is precipitated or upon the subsequent treatment of the deposit. These points have been sufficiently dwelt upon in earlier communications.¹

The results and conditions are:

No.	U ₃ O ₈ Present in Grams.	Acetic Acid cc.	Sodium Acetate in Grams.	Current in Amperes.	Volts.	Time in Minutes.	Temp.	U ₃ O ₈ Found in Grams.
1	0.1527	0.2	2½	3	14	18	ord.	0.1513
2	0.1527	0.2	4¼	3	12	15	"	0.1525
3	0.2613	0.3	5½	7	15	8	60°	0.2611
4	0.2613	0.25	4½	4	12	3	50	0.0344
5	0.2613	0.25	4½	4	12	15	50	0.0530
6	0.2613	0.25	4½	4	12	10	50	0.1074
7	0.2613	0.25	4½	4	12	18	50	0.1935
8	0.2613	0.25	4½	4	12	25	50	0.2467
9	0.2613	0.25	4½	4	12	30	50	0.2611
			Am. Carbonate in Grams.					
10	0.2613		1	5	15	25		0.2600
11	0.2613		2	5	13	30		0.2613

¹ Smith's "Electrochemical Analysis," p. 94.

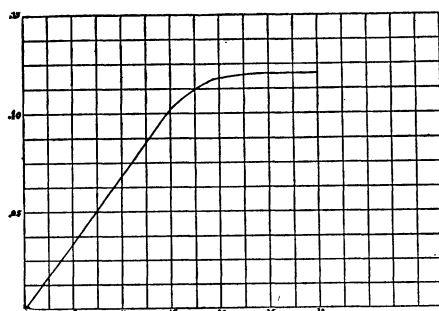
From both of these electrolytes the precipitation is not only complete but exceedingly rapid; hence, this method for the determination of uranium will recommend itself to the mineral analyst. The following curve was plotted from the preceding experiments.



CURVE I. Rate of deposition of Uranium Sesquioxide.

II. MOLYBDENUM.

From acidulated molybdate solutions the hydrated sesquioxide is completely precipitated as an adherent deposit on the cathode. This procedure has given an excellent and satisfactory method for



CURVE II. Rate of deposition of Molybdenum Sesquioxide.

No.	MoO ₃ Present in Grams.	Dilute Sulphuric Acid (1:10) in c. c.	Potassium Sulphate in Grams.	Current in Amperes.	Volts.	Time.	MoO ₃ Found.
1	0.1200	2	1	5	16	30	0.1197
2	0.1200	2	1	5	16	5	0.0335
3	0.1200	2	1	5	16	9	0.0603
4	0.1200	2	1	5	16	15	0.1026
5	0.1200	2	1	5	16	20	0.1190
6	0.1200	2	1	5	16	25	0.1198

the estimation of molybdenum as well as a most gratifying means of separating it from the alkali metals. The conditions were as follows:

From these data the following curve was drawn.

The rapidity with which the oxide separates and the ease with which the determination of molybdenum may be carried out in this way bids fair to render the electrolytic procedure the preferable method with all who acquaint themselves with it.

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